IMAGE PROCESSING ON ROAD DETECTION

[1]PRANJALI ULHE, [2]SAMTA GAWANDE, [3]KAJOL TAKSANDE

[1]Assistant Professor, [2]Research Scholar, [3]Research Scholar, S.D.C.E, Selukate, Wardha, RTMNU, Maharashtra, India
E-mail: pranjulhe@gmail.com, samtagawande@gmail.com, kvtkajoltaksande@gmail.com

Abstract- Most of the Indian rural and sub urban roads are not ideal for driving due to faded lanes, irregular potholes ,improper and invisible road signs. This has led to many accidents causing loss of lives and severe damage to vehicles. Many techniques have been proposed in the past to detect these problems using image processing methods. But there has been little work specifically carried out for detecting such issues of Indian roads. To address this acute problem, the study is undertaken with the objectives like, to make a survey Indian roads, to suggest the method to detect lanes, potholes and road signs and their classification and to suggest automated driver guidance mechanism. Using Image Processing Based on Edge Detection and Hough Transform has been developed to aid a driver in the lane departure decision-making, to reduce a loss of concentration and to prevent an accident while driving.

Keywords- Image Processing, Road Image Analysis, Hough Transform, Segmentation.

I. INTRODUCTION

Developing an automated driver guidance system is very important in the context of Indian road conditions. A driver finds it difficult to control the vehicle due to sudden pot holes or bumps or sudden turns where the road signs are not very prominent or missing most of the times. Suppose if there is a system with integrated motion camera and an integrated onboard computer with the vehicle, a simple driver guidance system based on frame by frame analysis of the motion frames can be developed and there by generate the alarm signals accordingly. So that the driving can be made quite easier. Road Image analysis is very important aspect for automated driver support system. Real-time qualitative road data analysis is the cornerstone for any modern transport system. So far, most of the analysis is done manually and the use of image processing techniques for qualitative analysis is still at its early stage. In this paper description about novel image processing algorithms together with the results is given, which assign a qualitative description to a road scene.

II. LITERATURE REVIEW

[1] "A Novel Feature for general Crack Detection," by` Han Hu, Quanquan Gu and Jie Zhou.

The prompt detection of the conditions in roads that may lead to a crack or rather a break now plays a critical role in the maintenance of roads worldwide. The inspection methods used to ensure road Ultrasonic Inspections are common place in the road industry in many foreign countries.

It is a relatively well understood technique and was thought to be the best solution to crack detection. Surface cracking often cannot be seen by the naked eye. They are effectively used to check for cracks located at the surface of metals such as roads.

[2] "Real time Detection of Lane Markers in Urban Streets," by M. Aly, presented at the IEEE Intelligent Vehicles Symposium Eindhoven University of Technology Eindhoven, The Netherlands, June 4-6, 2008.

The Lane Detection process through Hough Transformation can Detect edges to Identify the line separated over image. Binding the lines so that they do not get parallels. Real Time Road Images with real traffic conditions presents many challenges as for as image processing and analysis is concerned. The algorithm for Lane detection is modified in such a way as to suite the actual Indian roads. The author presents a robust and real time approach to lane marker detection in urban streets based on generating a top view of the road.

III. ANALYSIS

Methodology

Following are the phases of algorithm

A.) ROI Segmentation with Image Thresholding

The first step of the algorithm is the region of interest segmentation which can be detected using sign color information. A "region of interest" is an area of the image that may contain a road sign and is represented in figure 3. A new black and white image is constructed in which all the pixels that satisfy certain thresholds of the sign color are black and the background is white.

B.)Hough transformation algorithm for Lane Detection

Hough transformation (HT) maps a set of features in an input space to a set of parameters in an output parameter space.

The Lane Detection process through Hough Transformation can be considered in following steps:
1) Detect edges to Identify the line separated over image. Binding the lines so that they do not get parallels (horizontal to axis).
2) Calculating the high peaks.
3) Identifying nonzero points in peaks.
4) Straitening the line and placing the point on the line. Join these points.
5) Super impose the point joings over the original image.

IV. RESULT AND DISCUSSION

Result

Fig 1: Sample database for pot holes

Fig 2: Sample database for lanes

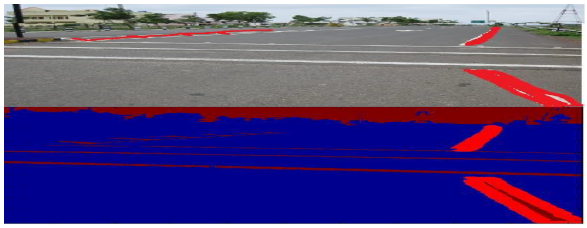

Fig 3: Sample result of lane detection

Discussion Proposed Work

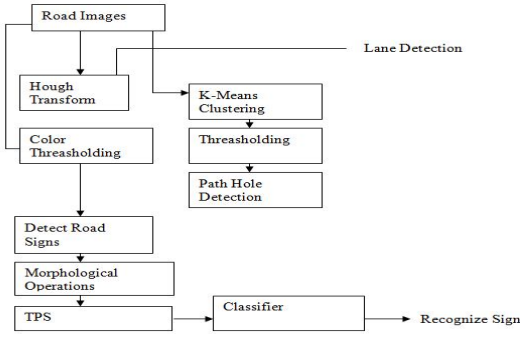

Fig 4: Generalized block diagram of the proposed work

In this study a database of Indian road images is collected. Images are acquired from a sedan from outside the driver's window with a digital still camera from a stationary vehicle. Hence, the images give an estimated view of the road side as seen by the driver. The proposed work considers stationary images to build the image processing system and leaves the blur removal filtering for future enhancement in the work. Acquired images are fed to the image processing system.An important feature in the image is the edges of objects. It is possible to extract image Contours from the detected edges. From the object contour the shape information is derived.
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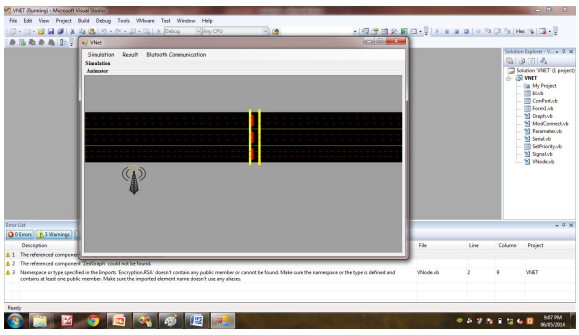
V. SOFTWARE METHODOLOGY

Dot net is a system which can be used in development of application of various kind such as console window based application, web based application and mobile application. Dot net contains various languages such as c#, VB.net, J#.net etc. In this project we are using Visual basic .net (VB.net) 2008 platform. Visual basic .net is a multi-purpose computer programming anguage from Microsoft that is suitable for most development needs. The language is designed with Rapid Application Development in mind, providing several tools to shorten development time.

Simulation system

It is a software which mask the functionality of the operating system and make the code to execute under its control. It provides the feature like platform independency, security, memory management. In VB.net to design form1 we used various toolboxes like menu strip, group box, etc. Coding of each toolbox used is created at back end of the designed form.



In this **fig 5:** we are having one menu strip that is consist of header simulation, result, serial communication.

Image processing

Digital Image Processing converts image data into digital data in order to bring information through various processes in a computer. The computer system, input or output data needs to be in digital format only. In the digital image processing, the system receives image data, then calculates it, and finally output digital image data. To store image data into the computer's memory can be performed by reservation the memory of the machine in the form of an array. The value in each array represents the quantity of pixel.The position of the image is determined by the position of the array.

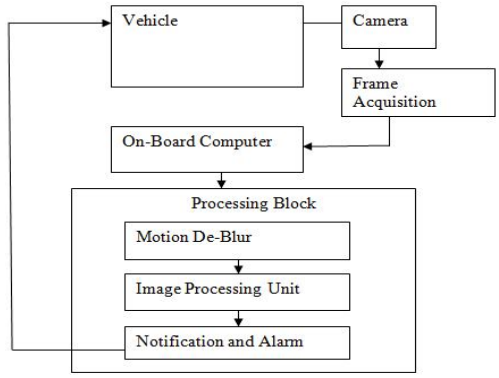


Fig 6: Basic block diagram for driver guidance system

The application of computer vision methods to traffic flow monitoring and road traffic analysis. The said application is utilizing image processing and pattern recognition methods designed and modified to the needs and constraints of road traffic analysis. These methods combined together gives functional capabilities of the system to monitor the road, to initiate automated vehicle tracking, to measure the speed, and to recognize number plates of a car.

Alarm terminal

In fact, human behaviours are indeed hard to recognize, predict and handle by current available equipment. Therefore, monitoring and warning system focusing on the vehicle behaviours are needed while the car is moving on the road. Arriving at Receiver stations, the acoustic energy is converted into electrical signals by the road mounted Transducers.
These signals are filtered, amplified, and processed to ensure that only valid signals are recognized. The absence of a valid signal at a Receiver signifies a severely cracked or broken road in the specific road section.

Communication from GPS

Even though GPS is becoming more and more used and affordable, so far only a limited number of cars are equipped with this system, typically fleet management services (e.g. taxi drivers). The vehicle location precision is relatively high, typically less than 30m traffic data obtained from private vehicles or trucks are more suitable for motorways and rural areas. In case of urban traffic, taxi fleets are particularly useful due to their high number and their on-board communication systems already in place.

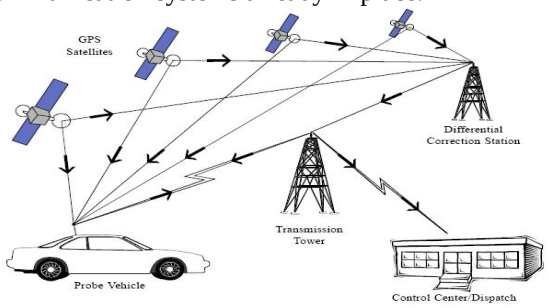


Fig 7: Communication from GPS

Currently, GPS probe data are widely used as a source of real-time information by many service providers but it suffers from a limited number of vehicles equipped and high equipment costs compared to floating cellular data.

CONCLUSION

Real Time Road Images with real traffic conditions presents many challenges as for as image processing and analysis is concerned. Segmentation process segments many unwanted parts of the image and not the pure road signs or pot holes. Similarly signs taken from different distances give different results. Therefore the proposed work is a break through as for as achieving results for Indian road images are concerned. The algorithm for Lane detection is modified in such a way as to suite the actual Indian roads. Road Sign detection, classification and recognition gives an overall efficiency of about 70% which can be further improved by developing better filtering techniques to filter out unnecessary objects like the riders or other backgrounds of the road.

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